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CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT
CD NO.

50X1-HUM

COUNTRY	USSR
SUBJECT	Economic - Coal
HOW PUBLISHED	Monthly periodical
WHERE PUBLISHED	Moscow
DATE PUBLISHED	Jan, May 1950
LANGUAGE	Russian

DATE OF INFORMATION 1950

DATE DIST. 28 Jul 1950

NO. OF PAGES 2

SUPPLEMENT TO REPORT NO.

THIS IS UNEVALUATED INFORMATION

SOURCE Ugol'.

KE-1 ELECTRIC LOCOMOTIVE STEPS UP MINING EFFICIENCY

NEW LOCOMOTIVE USES ALTERNATING CURRENT

V. I. Savchenko
Ugol', No 1, 1950

The use of direct current for electric traction necessitates building and using transformer substations; it also involves the difficulty of using direct current commutator motors. Academician V. S. Kulebakin first advanced the idea of utilizing alternating current for electric traction but for a long time the creation of a simple and reliable alternating current electric locomotive was not realized. Recently, an alternating current electric locomotive of the KE-1 (condenser electric locomotives, model 1) type was successfully developed by a group of associates of the Moscow Power Institute imeni V. M. Molotov as an assignment of the Ministry of Coal Industry.

This electric mine locomotive operates on a 380-volt alternating current network and does not contain any complicated transformer units. Externally it hardly differs at all from the ordinary direct current mine locomotive. The mechanical part of the II-TR-2 electric locomotive forms its base and it is equipped with two squirrel-cage induction condenser motors.

The first consignment of locomotives has been completed and the machines have been successfully tried out in Mine No 28 of Stalinogorsk Trust, Moskvougol' Combine, during a 3-month period. The locomotives are easy and safe to operate, have adequate tractive force, start the train smoothly, and have adequate speed. During the 3 months, 80,000 tons of coal were hauled. Trains were made up of 40 mine cars with a capacity of 0.7 tons each. The experiment indicated that the locomotive's activity will extend beyond the limits of mine transportation.

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CONDENSER ELECTRIC LOCOMOTIVES OPERATE IN DONBASS MINES

N. A. Staroskol'skiy
Ugol', No 5, 1950

Condenser electric locomotives for mines were first employed in the second half of 1949 in mines of the Donets and Moscow coal basins. The theoretical work and designing preceding their construction had been successfully carried out by workers connected with the Chair of Electric Traction of the Moscow Power Institute imeni V. M. Molotov, "Dinamo" Plant imeni Kirov, and the State Institute for Planning Coal Machinery.

Approximately half the experimental lot were sent to the Donbass, and the Donets Scientific Research Coal Institute observed the results of their operations.

The KE-1 experimental electric locomotives were constructed by the Toretskiy Plant and the mechanical part of the direct current II-TR-2 electric locomotive was used for their base. The electrical equipment was furnished by the "Dinamo" Plant imeni Kirov.

The specifications of the KE-1 locomotive are as follows:

Coupled weight	6.5 tons
Gauge	600 mm
Rigid frame	1,100 mm
Diameter of driving wheels	650 mm
Gear ratio of reductor	11
Operating speed of motors	
1st	5.3 km/hr
2d	10,7 km/hr
Operating voltage	380 v
Frequency	50 cycles/sec
Traction motor	MAK 51-6/12
Hourly rating of motor	
1st speed	9.5 kw
2d speed	19.5 kw
Continuous rating of motor	
1st speed	7.5 kw
2d speed	15 kw
Controller	KMR-56
Condensers	KM-o38-5
Amount of starting (full) capacitance	750 mfd
Amount of operating capacitance	210 mfd

During the period of operations some defects were noted in the functioning of certain units of the locomotives. These were largely due to the fact that the electrical equipment used for the experimental lot did not conform completely to requirements (condensers and traction motors were converted from crane equipment). All of these defects will be easy to eliminate.

Prolonged use of the KE-1 locomotive in the Donbass mines has proved it to be very suitable for operations there. The new locomotives have excellent pulling qualities and assure adequate productivity and safety of movement. The absence of transformer substations considerably simplifies electric haulage, reduces capital outlay, and operational costs. Haulage by these electric locomotives is more reliable than by direct current electric locomotives.

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